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Enclosure:  
Preliminary Draft of Proposed  
Site Criteria (16)

Harold L. Price, Director  
Division of Licensing and  
Regulation

Sincerely yours,

Transmitted herewith for the use of the Committee are  
16 copies of a Preliminary Draft of Proposed Site Criteria  
prepared by the Division of Licensing and Regulation.

Dear Dr. McCullough:  
Dr. C. Rogers McCullough  
Chairman, Advisory Committee  
on Reactor Safeguards  
U. S. Atomic Energy Commission  
Washington 25, D. C.

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Return to Dr. Beck  
C. Rogers McCullough

PRELIMINARY DRAFT OF PROPOSED SITE CRITERIA

50.46 Additional Criteria for Construction Permits - Site Considerations

a. General. The construction of a proposed nuclear facility at a particular site will be approved if there is reasonable assurance that the potential radioactive effluents therefrom, as a result of normal operation or the occurrence of any credible accident, will not create undue hazard to the health and safety of the public.

For the purposes of safety evaluation of a nuclear facility, including site evaluation, the following are defined as acceptable goals in the control of radiation and radiation exposures in areas beyond the site boundary:

- schuyler  
dickson*
- (1) In routine effluents from normal operation of the facility, the radioactivity released should not result in levels beyond the site boundary in excess of the maximum permissible levels for continuous exposures. The levels are described in Part 20 of the Commission's regulations.
  - (2) For the maximum accident which has a credible possibility of occurrence, the radioactivity which would be released even under pessimistic dispersion conditions should not result in doses beyond the site boundary in excess of the permissible emergency dose. For the purposes of this regulation this dose will be taken as 25 r whole body radiation or its equivalent.\* For smaller, more probable accidents this permissible emergency dose would have to be reduced. On the other hand, for the worst conceivable type of accident a larger emergency dose would be acceptable because of the extremely low probability of the accident.

It is not reasonable to establish rigid, quantitative specifications which must be satisfied for a reactor site to be approved. There are wide possible variations in reactor characteristics and protective aspects of facilities which

affect the characteristics which otherwise might be required of the site. However, the following criteria are utilized by the Commission as guides to the evaluation of sites for power and test reactors. The possibility is not excluded of deviating somewhat from these criteria, in the direction of either more or less restrictive specifications, if particular features of any facility or site should so dictate.

b. Exclusion Distance Around Power and Test Reactors. Each power and test reactor should be surrounded by an exclusion area under the complete control of the reactor owner. The size of this exclusion area will depend upon many factors including reactor power level, design features and containment, and site topography. For small power and test reactors a minimum radius on the order of one-quarter mile will normally be required. For larger power and test reactors an exclusion radius of one-half to three-quarter miles will normally be required. The size of the reactor alone does not determine the size of the exclusion area, but normally a power reactor above 100 megawatts thermal should have an exclusion radius more than one-quarter mile. Test reactors may require a larger exclusion area than power reactors of the same power.

c. Population Density in Surrounding Areas. Power and test reactors should be so located that the population density in surrounding areas, outside the exclusion zone, is small. Generally speaking, the reactor should be several miles distant from the nearest town or city and for large reactors a minimum of 10 to 20 miles distant from large cities. No centers of population within several miles of a power or test reactor should be in the direction of the prevailing winds. Nearness of the reactor to air fields, arterial highways and factories is discouraged.

d. Meteorological Considerations. The site meteorology is important in evaluating the degree of vulnerability of surrounding areas to the release of air-borne radioactivity to the environment. Capabilities of the atmosphere for diffusion and dispersion of such releases under the most unfavorable meteorological conditions likely to occur coincident with the most pessimistic air-borne release is used as a guide in assessing the vulnerability to risk of the area surrounding the site. Thus a site which has good diffusion conditions at all times and which has a wind direction pattern away from vulnerable areas would enhance the suitability of the site. If the site is in a region noted for hurricanes or tornadoes, the design of the facility must include safeguards which would prevent major radioactivity releases should these events occur.

e. Seismological Considerations. The earthquake history of the area in which the reactor is to be located is important. Earthquake history does not necessarily affect approval or disapproval of a site, but the magnitude and frequency of seismic disturbances to be expected are important in setting the specifications which must be met in design and construction of the facility and its protective components. A site should not be located on a fault.

f. Hydrology and Geology. The hydrology and geology of a site should be favorable for the management of the liquid and solid effluents (including possible leaks from the process) to avoid contamination of surface and ground waters and other mineral resources. Deposits of relatively impermeable soils over the aquifer are desirable because they offer varying degrees of protection to the ground water depending on the depth of the soils, their permeability, and their capacities for removing and retaining the noxious components of the effluents. Knowledge of the hydrology of the aquifer is important in assessing the effect that travel time may have on the contaminants which might accidentally

reach the aquifer to the point of nearest usage of the ground water. Knowledge of site drainage and surface water hydrology is important in determining the vulnerability of surface water courses to radioactive contamination. The characteristics and usage of the water courses indicate the degree of risk involved and determine safety precautions that must be observed at the facility in effluent control and management. The hydrology of the stream and its physical, chemical and biological characteristics are important factors in evaluating the degree of risk involved.

It is possible that a proposed reactor site might be unsuitable because of its relationship to a watercourse which is important as a source of public water supply or as a source of food.

g. Interrelation of Factors. All of the factors and criteria described in paragraphs b. through f. of this section are interrelated and distate in varying degrees the engineered protective devices for the particular nuclear facility under consideration, and the dependence which can be placed on such devices. It is necessary to analyze each of the environmental factors to ascertain the character of protection it might afford for operation of the proposed facility or the kind of restrictions it might impose on the proposed design and operation. Thus the more desirable site is one for which each of the environmental factors offers a high degree of protection to the public from radiation and radioactive effluents over and above the protection engineered into the facility.